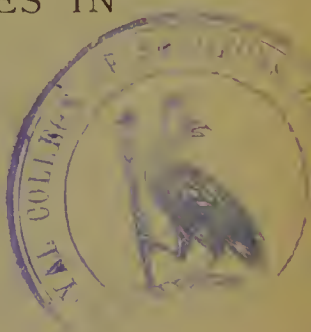
ON

A BACILLUS CULTIVATED FROM THE BLOOD

AND FROM

THE DISEASED TISSUES IN SYPHILIS.



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THE course of syphilis and the structure of the new formations indicate a probability amounting to a conviction that the disease is produced by a micro-organism, which gains access to the body by the primary inoculation, and is carried through the lymphatic system into the blood. We have, as opportunity permitted, continued to investigate the question of the etiology of syphilis since 1884, when one of us (Mr. Eve) showed bacilli in primary sore, indurated lymphatic gland, and secretion from sores, at a lecture on the Histology of Syphilis given at the Royal College of Surgeons.* We have, with increasing constancy as our methods improved, demonstrated bacilli in numbers in many (at least twelve) primary sores, in indurated glands from three cases, in gummata from two cases, in a papular syphilide, and in condyloma. After many attempts we have latterly succeeded in that which has hitherto not been accomplished—namely, in cultivating a morphologically identical bacillus from the blood of syphilitic patients in two instances, and from syphilitic tissues in three instances. We offer brief details of the following observations in which positive results were obtained.

1. A pure cultivation grew after inoculation, under stringent precautions, of solidified blood-serum with blood from

* Erasmus Wilson Lectures, 1884.

the lobe of the ear of a patient in the Lock Hospital, who had a profuse tuberculo-squamous syphilide. An indurated sore had existed two months, but he had taken no mercury. 2. Cultivation from the blood of a young man, an out-patient at the London Hospital, who had a general well-marked roseola, which had recently appeared. He had only taken mercury three weeks. 3. A patient in the Lock Hospital was suffering with a hard sore, a bubo, and a general tubercular syphilide. He had taken no mercury. With his consent a papule with the subjacent cutis was excised with scissors from the front of the thorax, the skin being previously cleansed with a solution of carbolic acid (1 in 20), and the scissors heated immediately before

FIG. 1.

Bacilli in sections of a syphilitic papule. The three pale bacilli were unstained, and are possibly bacilli containing spores (950 diameters).

FIG. 2.

Cultivation from blood (950 diameters).

use. A solidified blood-serum tube was at once inoculated from the lymph exuding from the base of the papule, and in the course of a few days a cultivation similar to the preceding developed. On subsequent examination sections of the papule showed very numerous bacilli scattered in the connective tissue interspaces of the corium and around and within the small aggregations of round cells, which in parts invested the capillaries. Many of the bacilli showed the unequal staining to be presently described; others were uniformly stained (see Fig. 1). 4. A similar organism was also obtained in a cultivation from a much enlarged and distinctly indurated lymphatic gland from a man who had an indurated but somewhat ulcerated sore in the furrow

around the glans penis. The sore and the glans were excised at the same time, and in both bacilli were demonstrated. The sore had existed for one month. He left the hospital shortly after the operation and was subsequently lost sight of. The condition of the glands, the histological characters of the sore, and the history of the case, were all in favour of the view that he had syphilis. 5. Cultivation from lymph exuding from the base of a somewhat inflamed sore on the inner surface of the prepuce, which was removed by circumcision. There were distinctly indurated glands in both groins, and the patient subsequently developed secondary manifestations. 6. An impure cultivation grew after inoculation with lymph from the base of a freshly excised condyloma.

FIG. 3.

Bacilli in section of a chancre (950 diameters).

FIG. 4.

Cultivation of bacilli from a phagedænic sore (950 diameters).

In none of the cases from which cultivations were obtained had mercury been administered for any length of time, and a long series of failures have led us to reject entirely cases which have been long under mercurial treatment. All these cultivations were composed of a very peculiar and somewhat polymorphous micro-organism (see Fig. 2), consisting of longer or shorter rod-like bodies, with rounded, and sometimes enlarged, or distinctly club-shaped ends; they were usually straight, but occasionally curved. The longer bacilli were as a rule unequally stained, and showed from three to five, or even eight, deeply stained segments united by unstained protoplasm and enclosed in a hyaline sheath. Organisms were observed in which the unstained material

was drawn out in a thread-like filament connecting the enlarged end to the rest of the bacillus. The shorter organisms were composed of two elongated or oval masses of stained protoplasm separated by a clear interval, which relatively increased as the bacillus became longer. The transitional forms from these to the long beaded bacilli were patent to the observer. If the specimens after staining were not well washed, the organisms were uniformly coloured, or the "beading" was indistinct; hence in sections this peculiar characteristic could not always be so clearly brought out; but it is well shown in Fig. 3, which was taken from a chancre in an undoubted case of syphilis. Many of the bacilli in sections of this sore were uniformly stained, or showed a clear median space such as may be seen in the shorter and more uniformly stained bacilli in Figs. 1 and 2. Other slight shades of difference may be explained by the varying conditions under which the organisms grow in culture media and in the various textures of the body. The bacilli in the case above referred to existed in great abundance, either singly or in groups, in the connective tissue interspaces around and at the base of the sore; they were less numerous in the granulation tissue, a fact which may be explained by the observations of Ribbert on the resisting power of leucocytes to the growth of micro-organisms. This was their usual mode of distribution in chancres, but they were in many instances observed in lymph capillaries and within large clear cells. In lymphatic glands the bacilli were most abundant within and in the tissues adjoining the peripheral lymph channels, and were observed also in lymph cells. In sections of condyloma they were numerous in the connective tissue interspaces of the corium, still more so throughout the epithelium, and formed colonies on the surface. In gummata they were most numerous at the margins, where the disease was extending. In a case of phagedænic sore, a cultivation (see Fig. 4) closely resembling that above described was obtained from the ichor flowing from its surface, and later from the lymph

flowing from the base of the sore after its free excision. Induration of the inguinal glands on both sides subsequently appeared, and syphilis was diagnosed. The general features and the staining reaction of this bacillus were the same as in that found in ordinary cases of syphilis, but the segmentation or beading was not so well marked. The cultivations in all cases appeared as a thin, faintly yellow or brownish yellow, uniform, or slightly tuberculated layer on the surface of the media. The organism grew in solidified blood-serum, which it did not liquefy, and less readily in solidified hydrocele fluid and agar-agar peptone. As regards its differentiation from the bacillus described by Alvarez and Tavel, as existing in normal smegma preputii, we find that, in contradistinction to the latter, the bacillus here described is, after staining with fuchsin, decolourised by dilute nitric acid. Decolourisation occurs both in cultivations and in sections, and is also accomplished by oxalic acid. We have studied the bacillus of normal smegma both in scrapings and by cultivations, and are unable to identify it with that which we have found in syphilis. Nor does it seem in the least degree probable that in syphilis a non-pathogenic organism should be found in all the lesions, even in the internal organs. In sections known to be crowded with bacilli uniformly negative results have followed the use of Lustgarten's method. Our best preparations have been obtained by staining with a solution of Humbolt red in aniline oil and spirit, and decolourisation with spirit. The bacilli can also be demonstrated, but less satisfactorily, by Gram's method, and still less so by Weigert's solution of gentian violet. The inoculation of monkeys with our cultivations has so far been unsuccessful in inducing syphilis, but so has also inoculation with portions of chancres and of phagedænic sores. Nevertheless, the cultivation of a morphologically peculiar bacillus in two instances from the blood of syphilitics and from some of the chief lesions, and its recognition in the diseased tissues,

have from analogy a striking significance in regard to the etiology of syphilis, and lead us to hope that by the continuation of our investigation we may yet experimentally prove that the organism described is the cause or the carrier of the disease. Owing to the attention which this question is now exciting in Germany we considered it necessary to publish this preliminary notice of our results.


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